

CLAIMS

What is claimed is:

- 5 1. A locking pin mechanism for variably locking together a rotor and a stator in a vane-type camshaft phaser having a rear cover plate and a front cover plate secured to the stator and enclosing the rotor within the stator, the phaser including means for supplying phase-advance oil and phase-retard oil to respective advance and retard chambers formed between the rotor and stator, the locking pin mechanism
- 10 comprising:
- a) a locking pin disposed in an axial bore in said rotor;
 - b) a well formed in one of said rear cover plate and said front cover plate for receiving a portion of said locking pin in locking mode;
 - c) means for directing said phase-advance oil to said pin for urging said pin from
 - 15 said well; and
 - d) means for directing said phase-retard oil to said pin for urging said pin from said well.
- 20 2. A mechanism in accordance with Claim 1 further comprising a return spring disposed in said bore for urging said pin into said well.
3. A mechanism in accordance with Claim 1 further comprising a spring guide disposed in said bore.
- 25 4. A mechanism in accordance with Claim 1 wherein said means for directing said phase-advance oil includes a first channel connecting said well to a supply of said phase-advance oil.

5. A mechanism in accordance with Claim 4 wherein said well is formed in said rear cover plate and said first channel is formed in one of said rear cover plate and said rotor.

5 6. A mechanism in accordance with Claim 4 wherein said well is formed in said front cover plate and said first channel is formed in one of said front cover plate and said rotor.

7. A mechanism in accordance with Claim 1 wherein said means for directing said phase-retard oil includes a second channel connecting said well to a supply of said phase-retard oil.

8. A mechanism in accordance with Claim 7 wherein said well is formed in said rear cover plate and said second channel is formed in one of said rear cover plate and said rotor.

9. A mechanism in accordance with Claim 7 wherein said well is formed in said front cover plate and said second channel is formed in one of said front cover plate and said rotor.

10. A mechanism in accordance with Claim 1 wherein said means for directing said phase-advance oil includes a first channel connecting said well to a supply of said phase-advance oil, and wherein said means for directing said phase-retard oil includes a second channel connecting said well to a supply of said phase-retard oil, and wherein the cross-sectional area of said second channel is smaller than the cross-sectional area of said first channel.

11. A locking pin mechanism for variably locking together a rotor and a stator in a vane-type camshaft phaser having a rear cover plate and a front cover plate

secured to the stator and enclosing the rotor within the stator, the phaser including means for supplying phase-advance oil and phase-retard oil to respective advance and retard chambers formed between the rotor and stator, the locking pin mechanism comprising:

- a) a locking pin disposed in an axial bore in said rotor;
- b) a well formed in said front cover plate for receiving a portion of said locking pin in locking mode;
- c) means for directing at least one of said phase-advance oil and said phase-retard oil to said pin for urging said pin from said well.

12. An internal combustion engine, comprising a vane-type camshaft phaser including a locking pin mechanism for variably locking together a rotor and a stator, said phaser having a rear cover plate and a front cover plate secured to said stator and enclosing said rotor within said stator, said phaser including means for supplying phase-advance oil and phase-retard oil to respective advance and retard chambers formed between said rotor and said stator, wherein said locking pin mechanism includes,

- a locking pin disposed in an axial bore in said rotor,
- a well formed in one of said rear cover plate and said front cover plate for receiving a portion of said locking pin in locking mode,
- means for directing said phase-advance oil to said pin for urging said pin from said well, and
- means for directing said phase-retard oil to said pin for urging said pin from said well.